The Creonic AWGN Channel IP is a noise generator capable of processing up to a maximum of 256 symbols in parallel. The IP was developed with the aim of allowing the performance evaluation of a digital communication system in the presence of Additive White Gaussian Noise. The emphasis is on evaluating systems with low bit error rates. Unlike a software-based AWGN generator, which might take several hours and even days for the stated purpose, a hardware-based AWGN generator requires significantly less time. Run-time is reduced by several orders of magnitude.

Benefits

- Design-time configuration of the number of symbols in parallel, quantization of input and output and precalculation of standard variation, for adjustment of resource utilization.
- Low-power and low-complexity design.
- AXI4-Stream interface for easy integration.
- Available for ASIC and FPGAs (AMD Xilinx, Intel).

Performance Figures

- Symbol rate of 53.76 Gsymb/s at 210 MHz.
- Latency of 61.9 ns at 210 MHz.

Channel Performance

The following figures depict bit-error-rate (BER) of the AWGN Channel as well as the SNR absolute error.

Features

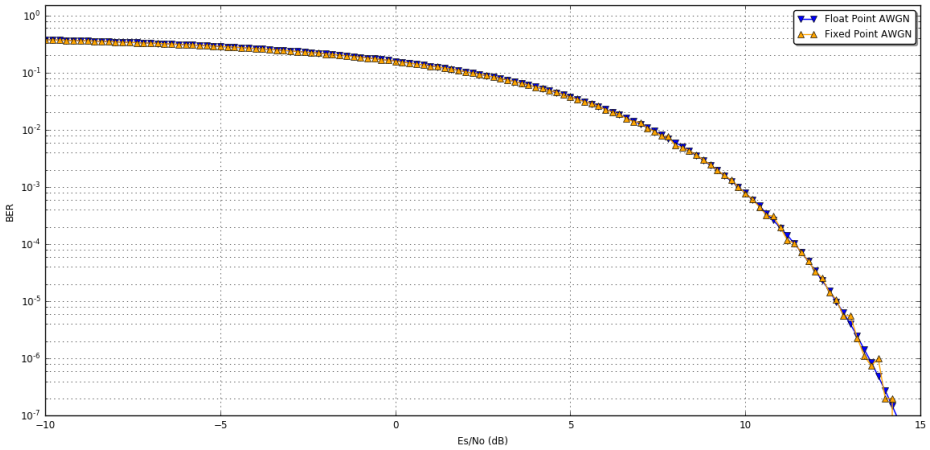
- Support for up to 256 symbols in parallel at 210 MHz
- Support for SNR (E_S/N_0) in the range from -10 to 41 dB with steps of 0.1 dB $\pm$ ~ 0.01 dB
- Synchronous design with one clock
- Noise sequence periodically generated at ~ $2^{64} \approx 2x10^{19}$ samples
- Based on Box-Muller algorithm and Central Limit Theorem (CLT)

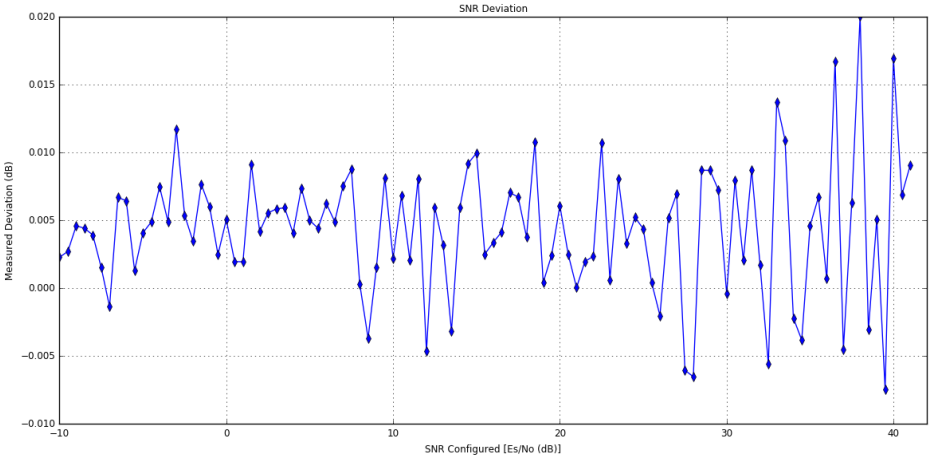
Applications

- Digital communication systems for which an AWGN channel is required

Deliverables

- VHDL source code or synthesized netlist
- HDL simulation models e.g. for Aldec's Riviera-PRO
- VHDL testbench
- bit-accurate Matlab, C or C++ simulation model
- comprehensive documentation


Float Point AWGN
Fixed Point AWGN
BER
Es/No (dB)


SNR Deviation
Measured Deviation (dB)
SNR Configured [Es/No (dB)]

About Creonic

Creonic is an ISO 9001:2015 certified provider of ready-for-use IP cores for wired, wireless, fiber, and free-space optical communications. All relevant digital signal processing algorithms are covered, including, but not limited to, forward error correction, modulation, equalization, and demodulation. The company offers the richest product portfolio in this field, covering standards like 3GPP 5G, DVB-S2X, DVB-RCS2, CCSDS, and WiFi. The products are applicable for ASIC and FPGA technologies and comply with the highest requirements with respect to quality and performance. For more information please visit our website at www.creonic.com.

Contact

Creonic GmbH	Phone:	+49 631 3435 9880	LinkedIn:	Creonic
Bahnhofstr. 26-28	Fax:	+49 631 3435 9889	Facebook :	Creonic
67655 Kaiserslautern	Web:	www.creonic.com		
Germany	E-mail:	sales@creonic.com		